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We claim:

1. A method of decontaminating an article, comprising:
enclosing the article in an environment;
humidifying the environment to enhance susceptibility of spores to
5 decontamination with chlorine dioxide;
reducing the pressure in the humidified environment to at least as low as 100
inches of water (0.25396 kg/cm^2); and
introducing into the environment a concentration of gaseous chlorine dioxide
effective to decontaminate the article by killing substantially 100% of the spores.
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2. The method of claim 1, wherein the article is porous.
3. The method of claim 1, wherein the article is non-porous.
- 15 4. The method of claim 1, wherein the environment is a rigid container, autoclave, or
hypobaric chamber.
5. The method of claim 1, wherein humidifying the environment comprises increasing
the relative humidity of the environment to at least 95%.
- 20 6. The method of claim 5, wherein humidifying the environment comprises increasing
the relative humidity of the environment to at least 90% for at least one hour.
7. The method of claim 6, wherein humidifying the environment comprises increasing
25 the relative humidity of the environment to at least 90% for at least three hours.
8. The method of claim 1, wherein the pressure in the humidified environment is
reduced to at least as low as 50 inches of water (0.12698 kg/cm^2).

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9. The method of claim 1, wherein the pressure in the humidified environment is reduced to at least as low as 29 inches of water (0.0736484 kg/cm²).
10. The method of claim 1, wherein the concentration of gaseous chlorine dioxide is at least 1000 parts per million.
11. The method of claim 1, wherein the concentration of gaseous chlorine dioxide is at least 2500 parts per million.
12. The method of claim 1, wherein the gaseous chlorine dioxide is humidified to at least 70% humidity.
13. The method of claim 1, wherein the gaseous chlorine dioxide is introduced concurrently with humidified air at least 70% humidity.
14. The method of claim 1, wherein the article is exposed to the gaseous chlorine dioxide for at least one hour.
15. The method of claim 14, wherein the article is exposed to the gaseous chlorine dioxide for at least six hours.
16. The method of claim 1, wherein the spore is a *Bacillus anthracis* spore.
17. The method of claim 1, wherein the spore is a weaponized spore.
18. The method of claim 1, wherein the article comprises paper.
19. The method of claim 1, wherein the environment is a decontamination chamber, humidifying the environment comprises increasing the relative humidity of the

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environment to at least 90% for at least one hour, the pressure in the humidified environment is reduced to at least as low as 29 inches of water ($0.0736484 \text{ kg/cm}^2$), the concentration of gaseous chlorine dioxide is at least 1000 parts per million, and the article is exposed to humidified gaseous chlorine dioxide for at least one hour.

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20. The method of claim 1, wherein the humidifying and the introducing into the environment a concentration of gaseous chlorine dioxide occurs at substantially the same time.

- 10 21. A method of decontamination, comprising:
sealing a room or building, thereby generating a sealed room or sealed building;
humidifying the sealed room or sealed building to enhance the susceptibility of
spores in the sealed room or sealed building to decontamination with chlorine dioxide;
and
15 introducing into the sealed room or sealed building a concentration of gaseous
chlorine dioxide effective to decontaminate the sealed room or sealed building by
killing substantially 100% of the spores.

- 20 22. The method of claim 21, wherein the humidifying and the introducing into the
environment a concentration of gaseous chlorine dioxide occurs at substantially the
same time.

23. The method of claim 21, wherein the sealed room or sealed building is at ambient
pressure.

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24. An apparatus for decontaminating a porous article, comprising:
a selectively sealable decontamination chamber;
a decontamination chamber humidifier;
a source of chlorine dioxide gas in fluid communication with the

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decontamination chamber; and

a decontamination chamber vacuum generator.

25. The apparatus of claim 24, further comprising:

5 a first fluid flow path for transferring humidified gas from the decontamination chamber humidifier to the selectively sealable decontamination chamber;

a second fluid flow path for transferring chlorine dioxide gas from the source of chlorine dioxide to the selectively sealable decontamination chamber; and

10 a third fluid flow path for evacuating the selectively sealable decontamination chamber via the decontamination chamber vacuum generator.

26. The apparatus of claim 25, further comprising a flow regulator in the first fluid flow path.

15 27. The apparatus of claim 25, further comprising a rotometer in the first fluid flow path.

28. The apparatus of claim 25, further comprising a nitrogen source and a fourth fluid flow path for transferring nitrogen gas to the decontamination chamber humidifier.
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29. The apparatus of claim 28, further comprising a fill valve in the fourth fluid flow path.

30. The apparatus of claim 28, further comprising a flow regulator in the fourth fluid flow path.
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31. The apparatus of claim 25, further comprising a flow regulator in the third fluid flow path.

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32. The apparatus of claim 25, further comprising a ventilation valve in the second fluid flow path.
33. The apparatus of claim 24, wherein the source of chlorine dioxide gas is a chlorine dioxide generator.
34. The apparatus of claim 24, wherein the selectively sealable decontamination chamber is a rigid container.
35. The apparatus of claim 24, wherein the apparatus further comprises a heat source for providing heat to the selectively sealable decontamination chamber.
36. The apparatus of claim 24, wherein the apparatus further comprises a hygrometer for regulating humidity in the selectively sealable decontamination chamber.
37. The apparatus of claim 34, wherein the rigid container comprises a heat source, a thermostat for regulating the heat source, and a hygrometer for regulating humidity in the rigid container.
38. The apparatus of claim 24, wherein the selectively sealable decontamination chamber comprises an autoclave or a hypobaric chamber.